

Cognitive Interviews

Cognitive interviews are used to test how people understand items of a questionnaire. In digital health research we use them to test how people who match the eligibility criteria for a later study (e.g., young adults) react to the content, tone/language, interface and features of a website or app. Usually, this will also involve checking how people navigate through the website or app. Cognitive interview procedures are useful because they allow the researchers to identify problems and barriers the user might experience while using a website or an app. They will also help researchers in iterating on the elements of the website or app to increase engagement and "impact".

During the interview, users are encouraged to 'think aloud' or say out loud what they are thinking or wondering about right in the moment when they look at the website, app or other material. This is important as it mimics real-life situations in which people appraise what they see in a very short time: imagine you look at a question in a survey, you immediately have a reaction (e.g., "this sounds weird", "no idea what this means"). Ideally, the interview length is between 45 and 75 minutes.

The researcher conducting the interview will use a series of neutral prompts (e.g., "what are you thinking now?", "what is your impression?") to encourage participants to say out loud what they are thinking. The researcher should engage in minimal talking, using prompts only to encourage the participant to think out loud and avoid any comments that may be considered leading.

Make sure you have a Think Aloud Guide to use during interviews. This starts with a simple introduction to read to participants at the start of the interview and is followed by a think-aloud practice in which the interviewers demonstrate how to think aloud before the participant gives it a try: e.g., "walk me through your home and count the windows as you go through the rooms". After that, participants go through the website, app etc. as they normally would and the think-aloud interview starts. The interviewer uses a series of neutral prompts that may be useful (particularly if the participant has gone quiet).

We usually also have some questions to ask after the interview: Post Think Aloud interview questions. These are to understand the overall experience with the website, app etc. in terms of the flow, features, and functionality etc. Finally, we usually also include big-picture questions about planned research procedures (e.g., "after looking at the website how do you feel about taking part in a study that use it") or about the subject matter covered in the survey/app/website (e.g. "how do you think about changing your eating habits"). This might be particularly useful as the participant was exposed to a specific (health promoting) content and might have some thoughts about it.

Here some useful points to optimise Think Aloud interviews:

- Make sure that the participant knows they are not under scrutiny or being tested in any way.
- Encourage the participant to comment as liberally as they can and to say all positive or negative comments.
- As the interviewer, use prompts such as 'Why did you think about this for a while' 'What made you laugh?' 'What are you thinking now?' 'How did you feel about that?'
- Avoid offering help for understanding questions/content/flow etc. One of the aims of think aloud interviews is to understand how participants perceive the website, app etc. If asked a direct question such as "what do you mean?", you could try saying, "just tell me what you

think it means". You could also ask the user what they think is unclear and discuss what should be changed. If participants have specific questions during the think-aloud interview you can tell them that you will talk about it following the interview.

- As the interviewer, please state what question the participant is on, particularly if it's not clear from what the participant says; for example you might say "we are on question 'How do you feel?'"

Below are a couple of references you may find useful:

Rowse, A., Muller, I., Murray, E., Little, P., Byrne, C. D., Ganahl, K., ... & Nutbeam, D. (2015). Views of people with high and low levels of health literacy about a digital intervention to promote physical activity for diabetes: A qualitative study in five countries. *Journal of medical Internet research*, 17(10).

Tourangeau R. Cognitive science and survey methods: a cognitive perspective. In: Jabine T, Straf M, Tanur J, Tourangeau R, eds. *Cognitive Aspects of Survey Design: Building a Bridge between Disciplines*. Washington, DC: National Academy Press; 1984:73–100.

Van den Haak MJ, De Jong MD, Schellens PJ. Evaluation of an informational web site: three variants of the think-aloud method compared. *Tech Commun*. 2007;54(1):58–71.

Charters, E. (2003). The use of Think-aloud Methods in Qualitative Research An Introduction to Think-aloud Methods. Brock Education, Vol 12 (2), pp68-82.

Willis, G. B., & Artino Jr, A. R. (2013). What do our respondents think we're asking? using cognitive interviewing to Improve Medical Education surveys. *Journal of graduate medical education*, 5(3), 353-356.

Willis G (2005). *Cognitive Interviewing. A Tool for Improving Questionnaire Design*. Thousand Oaks, CA: Sage Publications.